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WORLD MARITIME UNIVERSITY

Malmö, Sweden

**ANALYSIS OF SPECIALIZED CARRIERS'
MARKET BASED ON MICHAEL PORTER'S FIVE
FORCES MODEL**

by

Wen Yan'ao

A dissertation submitted to the World Maritime University in partial
Fulfillment of the requirements for the award of the degree of

MASTER OF SCIENCE

In

MARITIME AFFAIRS

2020

DECLARATION

I certify that all the material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my own personal views, and are not necessarily endorsed by the University.

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Title of Dissertation: **Analysis of Specialized Carriers' Market Based on Michael Porter's Five Forces Model**

Degree: **Master of Science**

The main content of thesis is to analyze the current international special shipping market based on the Michael Porter's Five Forces Model, understand the development status, market dynamics, and market trends of companies engaged in special shipping, so as to give some practical suggestions, including strategic level and tactical level, helps companies engaged in special ship transportation to develop their business better. Firstly, this paper explains the specific structure and principle of Michael Porter's Five Forces Model; then it introduces the types and functions of special ships one by one; then the paper introduces three types of ships with distinctive characteristics or significant market status and prospects has been analyzed, taking these three ship types: semi-submersible ship, pulp ship and multi-purpose ship as examples, the market status and prospects of these three types of ships are analyzed through Michael Porter's Five Forces Model.

To analyze the data, ship market information is collected, the national and regional strategic layout are analyzed, and the global economic trends have been forecast and the direction of infrastructure construction. These three types of ships are representative ships in the special ship transportation market. Through a thorough analysis of them, it is helpful for a more complete understanding of the overall situation of the special ship transportation market.

When the global economic situation is not stable and COVID-19 is spreading fast, the development trend of companies engaged in special ship transportation will also inadvertently change greatly due to the influence of many uncertainties. People must understand the challenges behind the risks, and people must learn how to avoid and use the risks and maximize the benefits. This paper will give reasonable suggestions based on the analysis results. Based on this paper, the shipping company can modify the strategy according to its own development status, and modify its own industrial structure, company internal structure, company development strategy, adjustment of shipbuilding and Ship recycling orders.

KEY WORDS: Assessment, Michael Porter's Five Forces Model, Shipping economy, Shipping market, Specialized carriers, Industry analysis

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ABSTRACT

With the continuous progress of science and technology in human society and the continuous improvement of infrastructure construction, more and more places in the world, especially in the maritime field, the transportation of special ships to participate in the construction is needed. Special ship transportation has a very unique position in the field of marine cargo transportation, which is different from the traditional ship transportation such as container ship transportation and bulk carrier, oil tanker, etc. Special ship transportation has distinct characteristics, the mode of transportation is special, the goods transported are special, and the place of transportation is special.

Therefore, in many cases the transport capacity of special ships is irreplaceable. Even the construction capacity of special ships and the capacity to undertake the carriage of goods in certain degree can reflect a country's industrial level and comprehensive strength. This thesis is written on this basis, based on the very classic Michael Porter's five force model in business analysis, to analyze the competitiveness of existing competitors in the industry, the entry ability of potential and competitors, the substitution ability of alternatives, the bargaining power of suppliers and the bargaining power of buyers. Taking semi-submersible ship, pulp ship and multi-purpose ship as cases, the present situation of special ship transportation market is analyzed, and the development trend of special ship transportation market is predicted. The aim is to provide market analysis, market forecasts and proposals for companies engaged in special ship transport to develop policies for the formulation of company policies.

Through in-depth investigation and data analysis of the market of special ship industry, combined with the current situation of the industry and the influence of other factors in the actual market, it is found that the overall situation of the special ship transportation market is more optimistic, although accompanied by the adverse effects of the economic crisis and epidemic situation, but

because infrastructure construction and energy demand are fundamental to the development countries and regions, special ship transportation is always indispensable. In the next three to five years, the development of the special ship market will be at a low and middle level, with a more stable but slow growth.

Key Words: Assessment, Michael Porter's Five Forces Model, Shipping economy, Shipping market, Specialized carriers, Industry analysis

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Chapter One

Introduction

1.1 Research Background and Significance

Since 2019, sustained trade tensions and outbreaks have led to a marked weakening of the global economic growth momentum, affecting the growth of manufacturing and international trade and will affect transmission through global value chains. With more and more important materials using special ship transportation, the global special ship transport industry competition pattern is constantly changing.

Since the transport function of special ships has a high added value, in recent years, many enterprises have been attracted to join the market competition, resulting in a situation in which the supply of special ships exceeds the demand.

Using the Michael Porter's Five Forces Model, taking semi-submersible vessels, pulp ships and multi-purpose ships as examples, from the competitiveness of existing

competitors in the special ship transportation industry, the competition of new entrants, the threat of alternatives, buyer's bargaining power and supplier's bargaining power, these five market forces could analysis the competitive status and pattern of the special ship transportation market, and put forward suggestions for the future development strategy of special ship transportation companies, and provide special ship transportation in the shipping market provide references.

1.2 Research Methodology

The research of this paper mainly adopts data analysis, literature analysis, because the author himself is about to enter the company engaged in special ship transportation, according to the author's previous practice and subsequent interviews with relevant practitioners, to carry out the research.

Based on SCI, HighWire Press, CNKI, ScienceDirect and so on, the author searched more than 40 relevant thesis around the world with the key words of Michael Porter's Five Forces Model, special ship transportation, shipping market, semi-submersible vessel, multi-purpose ship and pulp ship, mastered the relevant theory of special ship transportation market, and has mastered the subject and train of thought of this research, and laid the theoretical foundation for the research.

Data analysis and literature research are the main methods, and interviews with special ship transportation companies are auxiliary methods. Through the analysis of the latest data, we can effectively grasp the development of the special ship market, and the research on the literature is helpful to understand and master the key points and research ideas of the previous researchers.

1.3 Theoretical Basis and Literature Review

This paper mainly uses the relevant theory of Michael Porter's Five Forces Model to study and analyze. This section will elaborate on the concept of Michael Porter's Five Forces Model.

1.3.1 Definition of Michael Porter's Five Forces Model

Michael Porter's Five Forces Model was proposed by Michael Porter in 1979, which has produced a global and far-reaching impact on enterprise strategy formulation. Michael Porter's Five Forces Model can be used to analyze competitive strategies and effectively analyze the competitive environment of customers. These five forces are the competitive ability of existing competitors in the industry, the ability of

potential competitors to enter, the substitution ability of substitutes, the bargaining power of suppliers, and the bargaining power of buyers.

(1) Bargaining power of suppliers:

The supplier influences the profitability and product competitiveness of existing enterprises in the industry mainly through its ability to raise the price of input factors and reduce the quality of unit value. The strength of the supplier power mainly depends on what inputs as they provide to the buyer, when the supplier provided input elements of its value constitute the proportion of the total cost of the product is bigger, buyers is very important for buyers product production process, or seriously affect the buyer the quality of the product, the supplier for the buyer's potential bargaining power is greatly enhanced. Generally speaking, the supplier that meets the following conditions will have relatively strong bargaining power:

The supplier industry is controlled by some enterprises with a relatively stable market position, which are not troubled by fierce market competition. There are so many buyers of their products that it is impossible for any single buyer to become an important customer of the supplier.

The products of each supplier enterprise have certain characteristics, so it is difficult for buyers to switch or the switching cost is too high, or it is difficult to find substitutes that can compete with the products of the supplier enterprise. Suppliers can easily carry out forward association or integration, while buyers can hardly carry out backward association or integration.

(2) Buyer's bargaining power:

Buyers mainly affect the profitability of existing enterprises in the industry through their ability to lower prices and provide higher quality products or services. The buyer's bargaining power mainly has the following reasons:

The total number of buyers is small, while the purchase amount of each buyer is large, accounting for a large proportion of the seller's sales.

The seller's industry is composed of a large number of relatively small enterprises.

What the buyer is buying is basically a standardized product, and it is economically feasible to buy from multiple vendors at the same time.

Buyers have the ability to achieve backward integration, while sellers cannot achieve forward integration.

(3) Threats from new entrants:

New entrants in the industry to bring new production capacity and resources at the same time, the hope that in the existing enterprises, has been finished to win a place in the market, it is likely to happen with existing enterprise of raw materials and the competition for market share, eventually led to lower existing corporate profits in the industry, serious and may endanger the survival of these enterprises. The severity of the competitive entry threat depends on two factors, namely the size of the barriers to entry into new fields and the expected response of existing enterprises to entrants.

Barriers to entry mainly include economies of scale, product differences, capital needs, conversion costs, marketing channel development, government actions and policies, cost disadvantages independent of scale, natural resources, geographical environment, etc. Some of these barriers are difficult to be broken through by means

of replication or imitation. The expected response of existing enterprises to entrants is mainly the possibility of taking retaliatory actions, which depends on the financial situation of relevant manufacturers, the record of retaliation, the scale of fixed assets and the growth rate of the industry. In short, the likelihood of a new enterprise entering an industry depends on the relative size of the potential benefits, costs and risks that the entrant estimates subjectively.

(4)Threat from substitutes:

Two enterprises in different industries may compete with each other because the products they produce are substitutes for each other. The competition arising from substitutes will influence the competitive strategies of existing enterprises in the industry in various forms.

The increase in price and profit potential of existing enterprise products will be limited by the existence of alternatives that can be easily accepted by users. Due to the invasion of substitute producers, existing enterprises must improve the quality of products, or reduce the selling price by reducing costs, or make their products distinctive, otherwise their targets of sales volume and profit growth may be decreased. The intensity of competition arising from the producers of substitutes is influenced by the switching costs of product buyers.

In short, the lower the substitute price, the better the quality, and the lower the switching cost of users, the stronger the competitive pressure will be. The intensity of competitive pressure from substitute producers can be described by examining the growth rate of substitute sales, the production capacity and profit expansion of substitute manufacturers.

(5) Competition degree of competitors in the same industry:

Most of the companies in the industry, mutual interests are closely linked, as part of the enterprise overall strategy of the enterprise competition strategy, the goal is to make my own business relative to the competition advantage, therefore, is the inevitable result in the implementation of the phenomenon of conflict and confrontation, these conflicts and confrontation, make up the existing competition among enterprises. The competition between existing enterprises is often manifested in price, advertising, product introduction, after-sales service, etc., and the intensity of the competition is related to many factors.

Generally speaking, the following situations will mean the intensification of the competition among the existing enterprises in the industry, which is, the industry entry requirement is low, there are more equal competitors, and a lot of competition participants; The market rules tend to mature, product demand growth is slow; Competitors attempt to reduce prices to promote sales; Competitors offer almost identical products or services with low switching costs; If a strategic operation is successful, its revenue will be considerable. After receiving the weak enterprises in the industry, the companies with strong external strength launch offensive actions, resulting in the newly accepted enterprises becoming the main competitors in the market. The exit barrier is high, that is, the exit from the competition is more expensive than to continue to participate in the competition. Here, the withdrawal barriers are mainly influenced by economic, strategic, emotional and socio-political relations, including the specificity of assets, the fixed cost of withdrawal, strategic mutual restraint, emotional intolerance, and various restrictions imposed by the government and society.

1.3.2 Literature Review

The Clarksons' Research (2020) found that despite sluggish global economic growth, the Clarksons' Marine index remained on an upward trend in 2019, rising 12% on average in the first eight months of 2019 compared with the same period last year (and 13% for the whole of 2018). The tanker market as a whole saw a 75 per cent jump in earnings from a year earlier (partly due to a low base for the same period last year). Even despite recent tensions in the Middle East, the tanker market is expected to do well next year, supported by new IMO 2020 Regulations and oil trade with longer shipping distances.

Chen Xilian (2020) believes that the special ship transport market will show a trend of low volatility and slow recovery in the future, but the market demand is still at a low level and the growth rate is limited. "The competition situation of market capacity is still more supply than demand, so it is difficult to raise the freight price" (Chen Xilian, 2020, p.50).

Dimitrios Theocharis, Vasco Sanchez Rodrigues, Stephen Pettit, Jane Haider(2019) believe that the development of Arctic routes is a special ship companies to engage in a field worthy of competition.

Cai Jingwei (2018) believes that in the next few years, as the global economy gradually picks up and the global industry shifts, the demand for infrastructure construction and engineering project construction will gradually release, the demand for Marine transportation of engineering equipment will pick up, and the market demand for multi-purpose heavy cranes will remain at a low level.

Kou and Luo (2018) develop real option based rules for investing in shipping tonnage, taking into account the cyclical nature of freight rates. Freight rates are assumed to follow an arithmetic Ornstein-Uhlenbeck process.

Liang Yanyi (2020) believes that after the current implementation of the sulfur restriction order, the shipping company in the implementation of the lease business may be due to fuel quality or fuel injection and cause delay in the voyage, need to pay special attention to the provisions of breach of contract such as winding.

Yang Hong, Chang Chun and Hu Shuang (2018) think: as the international energy cooperation and speed up the pace of deep sea oil and gas exploration, the construction and operation of major oil equipment place (p.115), the distance between the mounting, big oil equipment location transportation security problem is more significant, more and more semi-submersible vessel enterprises will also look into profit margins greater energy transportation, semi-submersible vessel market competition will be increasingly fierce.

Chen Zhuli analyzed and compared the existing maritime management mode, Chen Zhuli (2019) conducted a focus group study and found that “the development trend of the future maritime market of major cargo, digitalization, technicalization, capitalization and light assets were the main directions of the future enterprise competition and development” (p.12).

Zhang Xinwei believes that “Since 2019, long term of trade tensions have led to a significant weakening of the global economic growth, which has affected the growth of manufacturing industry and international trade, and will affect the global supply chain of shipping” (Zhang Xinwei ,2019). The economic development environment

in Asia and the Americas is also full of uncertain factors, especially the industrial transfer caused by trade war between China and the United States, as well as the IMO low sulfur oil regular and other factors affecting the recovery process of the special ship transportation market. From the subdivision point of view: semi-submersible ship spot market has recovered, the future development prospects are promising; the timber ship market is at a low level, which is greatly influenced by the policies of importing and exporting countries (Zhang Xinwei ,2017). Asphalt ship market supply is greater than demand, the peak season may appear a small rebound; Ro-ro ship market is showing a downward trend and it will take some time to recover.

Nomikos et al. (2013) suggest a model where the risk neutral spot freight rate dynamics are described by a Merton jump diffusion. The model is tested on freight rate option data from the main dry bulk maritime shipping markets. They find that the jump diffusion model is superior to models based on the geometric Brownian motion.

Chen Baiquan (2020) found that the COVID-19 outbreak had a significant impact on orders for new ships, including special ships under construction. “Many orders have been delayed due to the impact of the COVID-19 outbreak, but in general, most ship orders can be delivered on time”. Chen Baiquan suggested that at this time companies should focus on: improving the ship emergency management ability, strengthening brand building, strengthening the digital transformation of enterprises and taking the new ship demand research as a regular project.

Chapter Two

Special Ship Transportation Market

2.1 Definition of Special Ships

A special ship refers to the cargo ship of dry goods and bulk liquid which has capacity that can load, unload and transport a certain kind of goods in a special way. Among them, special dry cargo ships mainly include professional heavy lift ships, ro-ro ships, semi-submersible vessels, automobile ships, timber ships, asphalt ships, bulk cement ships, live livestock ships, as well as multi-purpose ships with a lifting weight of more than 40 tons, which are used to transport heavy and long parts and also carry bulk cargo.

Engineering and work vessels providing services and security for maritime operations such as maritime transport, marine exploration, offshore drilling and offshore oil exploitation.

Special ships include: pontoon ship, research ship, survey ship, exploration ship, scientific research ship, hospital ship, practice ship, diving ship, meteorological ship, ground effect wing ship, survey ship, hydrofoil ship, catering ship, cleaning ship, Marine surveillance ship and other special ships.

2.2 Introduction of Different Types of Special Ships

2.2.1 Semi-submersible Vessel

Semi-submersible vessel, also known as semi-submersible mother ship, submerges the loading deck through the adjustment of its own ballast water so as to float the specific cargo (such as barges, yachts, ships, drilling platforms, etc.) from the designated position onto the loading deck of the semi-submersible vessel and transport the cargo to the designated position.

Semi-submersible vessel (Semi-submersible or Semi-submerged ship) is a special kind of ship design, different from the general surface ships, semi-submersible vessel usually have deeper draft, but again not like submarine disappeared completely in the water, but there are part of the hull or structure is exposed outside the surface of the water. Due to the high proportion of submerged volume in the water,

semi-submersible ships are less susceptible to the influence of waves on the surface of the sea, and can maintain better stability and be suitable for use as a working platform on the water. The first semi-submersible vessels were developed for the purpose of the Offshore drilling platform, but there are also including the semi-submersible crane vessel (Semi-submersible crane vessels, SSCV), Offshore support vessels, Offshore international support vessels (OSV), such as Offshore production platform. Many semi-submersible ships are tethered to a specific location and have no power of their own, so they need to be transported to the location by special ships such as heavy-lift ships (also a type of semi-submersible design vessel). But there are also semi-submersible platforms, such as the sea-based X-band radar, which are designed to travel at slow speeds and move by their own power.

2.2.2 Multi-purpose Ship

A multi-purpose ship is a ship that has multiple functions. Refers to the ship that can load general groceries, machinery and equipment, bulk cargo, and also can load containers. The ship has a strong cargo handling capacity and is equipped with cargo handling equipment with a wide range of uses. Broadly speaking, any ship capable of carrying more than two types of goods is a multipurpose ship. However, the general term multipurpose ship refers specifically to the multipurpose dry cargo ship. There are many kinds of dry goods, which can be classified into five categories according to the requirements on ship performance and equipment, namely, general cargo, bulk cargo, container, bulk cargo and ro-ro cargo. Therefore the objective of the multi-purpose ship is to efficiently carry these five types of cargo.

Multi-purpose heavy-lift ships are mainly used to transport traditional groceries, and are equipped with lifting equipment with stronger lifting capacity according to

demand to improve the loading capacity and efficiency of major goods, while focusing on the loading capacity of containers, with the aim of flexibly meeting various transportation needs and improving the operational flexibility and utilization of ships. With the diversification of world economic and trade forms and the increase of shipping market variables, the multi-purpose heavy crane with large cargo hold is becoming more and more popular in the market.

2.2.3 Pulp Ship

A kind of Open Hatch Cargo Ship (commonly known as a pulp Ship) typically carries pulp. In fact, the pulp ship can not only transport pulp, but can also transport high-speed rail trains, wind power equipment, large machinery and super-long overweight steel pipe pile structure and so on.

2.3 Current Situation of the World Wide Market for Special Ships

On the present situation of special ship transportation market in the world, this thesis will make classification and analysis from the company as well as the ship type perspectives.

2.3.1 World's Leading Special Ship Companies

The first is the Dutch Boskalis (Dockwise), China's ZPMC COSCO Specialized Carriers, China and its subsidiaries, and Norway's Offshore Heavy Transport (OHT). OHT: in March 2020, Dogger Bank, the world's largest offshore wind farm, announced that it would select the Alfa Lift of Norwegian owner OHT as the single-pile foundation transport and installation work for GE Haliade-X 12MW wind farm. The Alfa Lift is the world's largest and most innovative offshore wind power construction ship specially designed and built for the offshore wind sector and is expected to be delivered and put into service in March 2021. This project is the key to the company's development in the next three years.

Boskalis (Dockwise) : Boskalis of the Netherlands acquired Dockwise in 2018, becoming the world's largest multi-purpose Marine heavy transport company. Its "BOKA VANGUARD" semi-submersible ship is currently the world's largest semi-submersible ship. In 2019, "Boskalis achieved a net profit of 75 million euros, reversing a loss of 436 million euros in the same period last year" (Boskalis, 2019). The decline of EBIT (Earning Before Interest and Tax) was mainly due to the poor performance of the offshore energy sector in the first half of the year, and a few offshore wind power cables and decommissioning projects had operational and contractual problems. In 2019, Boskalis was awarded a major offshore wind project in Taiwan, China. This project is an important project for the company to maintain its competitiveness and maintain its own development.

COSCO Specialized Carriers Co., Limited: COSCO Specialized Carriers of China is the second company which is from China after the Netherlands that can build self-propelled semi-submersible ships, and currently owns and operates 8

semi-submersible ships. The report for the first quarter of 2020 showed that, affected by the covid-19 epidemic, the overall ship volume, turnover, operating rate and load capacity all declined to varying degrees, while the sailing rate increased slightly (5.6%). According to the operating data of the ship type, the traffic volume of heavy crane ship and asphalt ship increased, while the traffic volume of multi-purpose ship, semi-submersible ship, automobile ship and timber ship decreased. The overall figure shows a downward trend, down 8.8 percent from the same period last year. In the first quarter of this year, COSCO Specialized Carriers shipping business achieved an operating income of 1.985668 trillion RMB, with a net profit of 4.58 million RMB attributable to shareholders of the listed company.

In 2016, COSCO Specialized Carriers of China has created many firsts and firsts in the industry. It has become the only shipping company in the world that operates routes between the north and south poles. Multi-ship transportation of the world's largest liquefied natural gas (Yamal LNG) project; It has set the world record for single-ship cargo volume of wind power equipment carried by heavy crane ships and multi-purpose ships. COSCO Marine New Energy Co., Ltd. cofound to expand offshore wind power installation business with GeoSea NV, a company owned by Belgian Marine industry giant DEME group. COSCO Marine New Energy entered the pulp transportation market successfully; it cooperates with group for the first time to expand automobile domestic trade transportation; COSCO won the master contract of logistics and shipping services for the world's largest oil and gas project in Kazakhstan.

In the face of the adverse impact brought by COVID-19 epidemic, COSCO Specialized Carriers of China continued to promote the adjustment of fleet structure, optimized the distribution of shipping capacity, and improved the company's source

structure. In the first quarter, the company's operating revenue and revenue from the main shipping industry increased by 1.24% and 2.54% respectively, and the term lease level also increased by 8% year-on-year, showing a good ability to generate revenue.

Zhenhua Port Machinery Company Limited (ZPMC): in recent years, Zhenhua Port Machinery Company Limited has successively built 26 6000-ton complete transport ships, among which 7 are semi-submersible self-propelled ships. In addition, ZPMC acquired GREENLAND HEAVY LIFT through its wholly owned subsidiary, Hong Kong ZPMC, in the form of an equity investment. At the same time four semi-submersible vessels under the control of HOLDINGS LIMITED (GPO), two of which are 65,000 ton semi-submersible vessels are being built.

2.3.2 Current Status of Shipping Different Ship Types

In general, the special professional ship market in the first half of 2020 is affected by the slow growth of the global economy and the COVID-19, the overall performance is low, and the market trends of each segment are different, but they all show weak operation. It is expected that in the second half of the half-submersible ship, wood ship supply and demand contradiction pressure is relatively large, asphalt ship, car ship in the peak season and favorable policy factors are expected to improve slightly.

Semi-submarine shipping market: According to statistics, there are currently 59 semi-submarine ships in service ,17 are under construction or signed orders. China's major semi-submersible ship operators are: COSCO special shipping, Shanghai Zhenhua heavy industry and salvage bureau units. Although the current semi-submersible transport market is affected by excess capacity, the market of

marine industry is depressed, but the recent rigid demand, future demand growth trend and the special advantages of semi-submersible transport ships will not change in a short period of time.

Pulp ship transport market: Global paper product transport includes the transport of recycled fibers, market pulp, flat paper and paperboard, with average monthly transport at 4 around 10 million tons, and the volume of transportation in 2018 is less than the same period in 2017. In particular, the waste ban led to a relatively large decline in the transport of recycled fiber, some growth is due to the increase in global cardboard consumption of pulp trade transport volume. Among the traditional top 10 shipping routes for paper products, North America, Western Europe, Japan and China have seen a sharp drop in the volume of waste paper recycled fiber transport, and North America's pulp import and export routes as a result of trade policy have also decreased, while Latin America to West The volume of pulp export from Europe, Latin America and Western Europe to China is affected by China's demand and has increased.

It can be seen that the special ship market in the world is complex at present, and each subdivision ship type presents the characteristics of small market capacity, small source of goods, weak ability to bear the risk of market fluctuation, and at the same time, it is also subject to the cross-border competition of container ships and bulk carriers, and the market is very depressed. The major shipping companies only seek innovation, around the large-scale national strategic layout, tracking and acquisition of major projects, can continue their own development.

Chapter Three

Michael Porter's Five Forces Model for Special Ship Transportation Market

There are many kinds of ships engaged in special ship; this paper lists three typical special ships: semi-submersible vessel, multi-purpose ship and pulp ship. According to the market analysis of these three types of ships, the conclusion is helpful for the reference of this special ship transportation industry. The structure of semi-sub of semi-submersible ship and multi-purpose ship is more prominent, their transport tasks are obviously different from those of other types of ships.

3.1 Michael Porter's Five Forces Model for Semi-submersible Vessel Transportation Market

3.1.1 *Competition Status of Existing Competitors in Semi-submersible Vessels' Market*

The market pattern of semi-submersible vessel was dominated by four companies in the early stage: Dockwise (now Boskalis) of the Netherlands, COSCO Specialized Carriers Co., Limited, Shanghai Zhenhua Port Machinery Company (ZPMC) and OHT of Norway. The market was in a monopoly state. Now, because OHT capacity is shrinking and ships are older, three other companies are dominating the market, creating a three-horse race.

The market positioning of the three companies is also different. After acquiring Dockwise, Boskalis, relying on its market influence in the field of offshore construction, has expanded its business scope from the traditional major piece transportation to the fields of underwater installation, maritime security check, offshore wind power installation and so on (Boskalis, 2019). Relying on the brand influence of COSCO Shipping Group, COSCO special semi-submersible fleet has gradually participated in the high-end market of oil and gas industry and formed some industrial advantages. ZPMC semi-submersible ships with their own goods and market spot transport is given priority to, and through the acquisition of external semi-submersible vessel company to enter the market of oil and gas, ZPMC's 2018 annual report, will use the advantages of steel structure building, give full play to the fleet size and variety advantages, improving the capacity of ocean engineering orders, and strengthen the core parts of technical research and development, creating Marine heavy industry and offshore wind power industry chain.

3.1.2 New Entrants to the Semi-submersible Vessels' Market

In recent years, with the continuous development of ocean engineering and the oil and gas market, the rising demand for heavy transportation indeed there are many well-equipped semi-submersible vessels in use, which are equipped with DP system, targeting high-end market, but these new entrants to the enterprise did not realize well, semi-submersible vessel industry for fleet coverage, special operations, safety management and fleet benefit integration ability and professional technology, the requirement of the comprehensive ability is high. Moreover, as the semi-submersible market itself has a high entry threshold, it is difficult for emerging competitors to gain a place in the market in a short period of time. However, the high maintenance cost and human resource cost of ships will make it difficult for new entrants to keep going.

3.1.3 The Threat of Alternatives to Semi-submersible Vessels

In the transportation of special ships, container ships and deck ships pose a threat to other special ships, especially semi-submersible ships, but to a limited extent. The particularity of the structure of container ships determines that in most cases only goods that can be carried by containers can be transported. For some heavy and large items as a whole, such as: Oil RIGS platform, offshore wind power generator objects, such as container can carry only a few, but under normal circumstances, the major objects not only need by sea, also need to be installed directly at the site where the project is located, transportation and installation of the two are inseparable, both for container ships are hard to do. Even if the ship can transport this kind of cargo, it will face the problems that the special structure of the ship can not carry out loading and unloading of goods and installation in the engineering site. However, when the cargo

weight is lighter or the value is lower, the deck ship becomes the primary competitor and substitute of semi-submersible vessel due to its cost advantage. Affected by the slowdown in global commodity demand, the upstream customer budget costs have been compressed, the deck ship's competitive advantage will be more obvious. At present, most deck ships on the market are under 20,000 tons in total tonnage. Compared with semi-submersible vessels, deck ships have the following advantages:

First, the construction and maintenance costs are relatively low, and the ship charter and late fees are highly competitive with semi-submersible ships;

Second, in the transportation operation and offshore installation required by non-DP, such as module transportation, module installation and platform disassembly, semi-submersible ships will be affected to a certain extent and have strong substitutability.

3.1.4 Bargaining Power of Buyers of Semi-submersible Services

Different from other forms of cargo transportation, the transportation of large and heavy cargo is a form of global operation, with no fixed routes and schedule. There is no fixed route or schedule, and the main customers can be divided into middle and low-end customers and high-end customers according to their requirements for semi-submersible ships.

Middle and low-level customers: the middle and low-end customers are mainly construction and construction enterprises in the field of construction engineering. The goods are mainly single spot goods and non-oil and gas industry goods, such as large ships, large steel structures, etc. This customer group's requirement for

semi-submersible ship is the most basic cargo suitability, and its main concern is the shipping price. Affected by the slowdown in global external demand, ship rental prices have been declining in recent years. In order to find a better price, such customers usually seek multiple quotations in the market. The situation of “more ships and less goods” in the market also tends to lead to price competition among shipowners. Under the current market situation, the bargaining power of this customer group is relatively strong.

High-level customers: high-level customers are mainly the companies which develop gas & oil and some companies related Engineering Procurement Construction (EPC), whose goods are mainly oil and gas industry project goods, such as drilling platforms, oil and gas module floating structures, etc. Although the freight rate is the main consideration, these companies pay more attention to the comprehensive competitiveness of shipowners' experience, scale, management, technology and safety. In recent years, affected by low global oil and gas prices, these high-end customers have adopted the strategy of ***technology upgrading + management optimization*** to reduce production and operating costs in order to maintain the survival and sustainable development of enterprises. In recent years, the rental price of ships continues to decline, and semi-submersible ship owners, as downstream contractors, have seen their profit margins significantly squeezed. As the oil and gas development is a monopoly industry, semi-submersible ship owners, as shipping service providers, are often in a passive position in the negotiation of shipping rates and are weak in price negotiation.

3.1.5 Bargaining Power of Semi-submersible Suppliers

Semi-submersible ship suppliers mainly include fuel suppliers, ship spare parts suppliers and port agents.

Fuel: fuel price is directly affected by international oil and gas price, and no company has bargaining power over fuel price. Larger companies may reserve fuel in anticipation of rising or falling oil prices to keep fuel costs as low as possible. In particular, IMO's mandatory requirement that all ships in worldwide use fuel oil with sulfur content less than 0.5% by 2020, which has further increased the fuel cost of ships.

Marine spare parts: due to the special function and structure of semi-submersible ship, there are relatively few Marine equipment suppliers to choose from, and some core equipment are even irreplaceable. With the rise of global raw material prices and the technological monopoly of some equipment suppliers, the price of ship spare parts has been rising continuously in recent years, and shipowners basically have no bargaining power (Yang Hongsuo & Zhang Qun & Hu Shuang, 2018). In addition, with the mandatory implementation of the ship ballast water convention and low-sulfur oil regulations, the equipment and maintenance costs of semi-submersible ships have been increased.

Port agency: port agent is mainly divided into monopoly canal agent and general port agent. Ship owners have no bargaining power because of port agency's monopoly position. The price of the general port agent is directly linked to the size of the fleet. The larger fleet or transport group can have some extent of bargaining power in the port agency to reduce part of the cost. However, in some countries or ports, agency fees may be monopolized and there is almost no room for bargaining.

3.2 Michael Porter's Five Forces Model for Pulp Ship Transportation Market

Pulp ship is a relatively new type of ship in the field of special ship transportation. In the first seven months of 2018, the global shipping volume of pulp increased by 2.2% year on year. The China-US trade friction led to a 4% year-on-year decline in the shipping volume of north American export, but China's pulp import volume still maintained the largest growth rate, reaching 6.2%. There are three major pulp export markets in the world: North America, Western Europe and Latin America. The main import market is Asia, especially China. North American export pulp is transported to Western Europe by dedicated pulp ships or container ships in batches, some are used locally, and some are re-exported to China or other Asian countries. The three export regions, because of the different types of pulp products, also have trade exchanges with each other, resulting in shipping production.

3.2.1 Existing Competition in Pulp Ship's Market

According to statistics from Lloyd's Ship database, as of January 2019, there are 302 Open Hatch Cargo ships (pulp, commonly known as pulp ships) in global fleet, with a total capacity of about 13.36 million DWT and an average fleet tonnage of 44,200 DWT. Vessels with a tonnage of more than 30,000 tons and less than 60,000 tons are the main vessels of the pulp fleet. This table shows the tonnage distribution of the global pulp fleet. Among the pulp fleet, the ships flying the flag of panama and the flag of Bahamas are the most, followed by those flying the flag of Singapore and Norway, and those flying the flag of Marshall islands, Malta, Liberia and other countries and regions. Table 1 shows the tonnage distribution of the global pulp fleet.

Table 1*Tonnage distribution of the global pulp fleet*

Ship Company	Ship Number	Proportion of ship/%	Deadweight	Proportion of Deadweight/%
<20,000	2	0.66	27,822	0.21
20,000~30,000	20	0.62	517,164	3.87
30,000~40,000	107	35.43	3,676,967	27.52
40,000~50,000	76	25.17	3,490,813	26.13
50,000~60,000	63	20.86	3,419,541	25.59
60,000~70,000	29	9.6	1,864,152	13.95
≥70,000	5	1.66	36,484	2.73
Total	302	100	13,361,924	100

Note: Adapted from Clarksons Research: Current status and prospect of the pulp ship market, Wang Zheng, 2019, p.7, *World Shipping*.

Currently, the two largest shipping companies operating pulp ships are G2 Ocean AS and Saga Welco, which own 78 pulp ships (4,253,000 DWT) and 52 (2.61 million DWT) respectively, accounting for 31.8% and 19.6% of the global fleet's total deadweight tons. In addition, Germany's Oldendorff Carriers operate 13 vessels of 492,000 DWT, while SMT Shipping of Cyprus own 11 vessels of 494,000 DWT Pulp ship capacity. Table 2 shows the current status of global pulp shipping company capacity.

Table 2*Current status of global pulp shipping company capacity*

Ship Company	Ship Number	Proportion of ship/%	Deadweight	Proportion of Deadweight/%
G2 Ocean AS	78	25.83	4,253,300	31.83
Saga Welco AS	52	17.22	2,613,691	19.56
Oldendorff Carriers GmbH & Co	13	4.3	491,542	3.68
SMT Shipping Cyprus Ltd	11	3.64	493,591	3.69

MUR Shipping BV	9	2.98	325,238	2.43
Toko Kaiun Kaisha Ltd	7	2.32	241,774	1.81
Lauritzen Bulkers A/S	6	1.99	211,209	1.58
Pan Ocean Co Ltd	6	1.99	319,850	2.39
Taylor Maritime HK Ltd	5	1.66	163,067	1.22
GMB Maritime Liner Services	4	1.32	212,006	1.59
IMC Shipping & Offshore Tech	4	1.32	259,457	1.94
Plioneer Marine Advisers Pte	4	1.32	129,303	0.97
Westwood Shipping Lines Inc	4	1.32	183,851	1.38
Others	99	32.78	3,463,504	25.92
Total	302	100	13,361,383	100

Note: Adapted from Clarksons Research: Current status and prospect of the pulp ship market, Wang Zheng, 2019, p.2, *World Shipping*.

3.2.2 Competitiveness in the New Pulp Ship's Market

From the point of view of new orders for the construction of pulp ships, it is mainly executed by existing strong competitors. Therefore, the competitiveness of new entrants is relatively limited. At present, the world has a total of 17 new orders for pulp ships, a total of 887,400 deadweight tons, ranging from 24,000 to 62,000 deadweight tons, of which 50,000-60,000 tons are new ships. In 2017, COSCO Specialized Carriers invested in building 2 + 1 62,000ton multi-purpose pulp ship at Dalian COSCO Heavy Industry. On this basis, an additional investment will be made in the construction of 5+4 62,000ton multi-purpose pulp vessels in 2018, and the nine vessels will be delivered from the end of 2019 to 2021.

3.2.3 Threats of Alternatives to Pulp Ships

The main alternatives to pulp ships are container ships and bulk carriers. The main form of pulp is flocculent object. Theoretically, container ships and bulk carriers have some transport competitiveness. However, the ship structure of these ships is not specialized enough for the transportation of pulp, and the storage of pulp products cannot be optimized. Even if it can complete the transportation of pulp, the transportation efficiency will be relatively low due to frequent port connections and various types of transportation. Therefore, in the long run, the replacement of pulp ship poses some kind of threat to the ships specialized in pulp transportation. However, due to the objective reasons of cost and technology, it is difficult to truly replace the position of pulp ship.

3.2.4 Bargaining Power of Buyer's of Pulp Ship's Services

Buyers currently have limited bargaining power and little say in setting prices. For China, domestic consumption of paper products will continue to support pulp demand in the future. In the context of supply-side reform and the elimination of backward production capacity, a large number of small and medium-sized paper mills have been shut down, while large paper enterprises have steadily expanded production capacity and increased output. In 2018, the prosperity of China's paper industry has declined. In the first three quarters, China produced 88.664 million tons of various paper products, down 7.25% year on year. Due to the impact of environmental supervision, the operating rate of paper enterprises has declined, and the industry is facing the pressure of destocking to some extent. Affected by the different growth rates of downstream demand industries and the waste prohibition order, the output of different types of paper varies greatly: the output of four types of

paper with wood pulp as the main raw material, such as household paper, white card paper, box board paper and white board paper, increases, while the output of paper with waste pulp as the raw material, such as double adhesive paper, double copper paper and corrugated paper, decreases slightly. From the terminal consumer demand, China's daily paper consumption is far less than developed country, despite the rapid expansion in the Internet and electronic media which limits the development of culture paper demand, but the electricity industry is on the rise, and so did the packing paper demand, Second-Child policy will also increase the life paper demand, market expectations mill stabilized production demand is expected to rebound in 2020.

Therefore, paper is a necessity for consumers, and in most cases, paper is priced at a low price, so consumers are not sensitive to the price in this range. Just like this, consumers have limited bargaining power in this model.

3.2.5 Bargaining Power of Pulp Ship Suppliers

In the pulp trade relationship, the pulp supplier has the controlling position and the right of speech in the whole supply chain, and is responsible for the whole pulp logistics business. The paper mill is relatively passive in the whole pulp supply chain and only receives the goods in the factory (Yan Xu ,2018). The major pulp hub ports in China have obvious characteristics: close to the paper mills, multi-purpose terminals for containers and groceries, sufficient storage capacity and bonded storage capacity, and convenient customs clearance. At present, Qingdao port in north China is a unique; East China region is Changshu port alone big, Shanghai port strengthens the competitive ability unceasingly; In south China, the two ports of Nansha and Zhuhai are contending for each other. Pulp and pulp logistics companies have

common characteristics: with the port shares or other close cooperative relationship, in the local port consignee (paper mill) or shipper (pulp mill) is the only, exclusive agent; Have the professional ability of pulp (know the varieties and characteristics of pulp); Have strong comprehensive operation ability (can meet the paper mill or pulp mill's declaration, bonded, barge, automobile, railway transport and other logistics needs).

In the first three quarters of 2019, sales of chemical pulp increased by 2.8% in the world's 20 major pulp producing countries, while shipments of cork pulp fell 1.8%, while hardwood pulp jumped 7.2%. The top ten countries with the largest pulp output are the United States, Brazil, Canada, China, Sweden, Finland, Japan, Russia, Indonesia and Chile, accounting for 82.35% of the global pulp output. It is expected that global pulp production capacity will not increase significantly from 2020 to 2021, and supply growth will slow down significantly in the next five years. The United States, Brazil and Canada are the largest pulping countries. In the future, the production capacity of major producing countries such as the United States, Japan and Sweden will be basically stable, while that of Brazil, northern Europe and Indonesia will be greatly increased.

Therefore, it can be seen from the current status of pulp suppliers in China that suppliers have absolute say and bargaining power in the process of pulp transportation.

3.3 Michael Porter's Five Forces Model for Multi-purpose Ship Transport Market

The operation of multi-purpose ships is different from that of general transport ships. Operators need to have a strong ability to contract goods in a market with limited demand, establish close contact with shippers and traders, and be familiar with the technical parameters of carriers and make detailed transport plans. Therefore, it is usually monopolized by traditional shipping enterprises with rich experience and extensive market connections. Shipping companies should actively track the research and judgment of the market, fully promote the fleet to improve the quality and efficiency, strictly control the cost expenditure, and strive to achieve high-quality development, breakthrough development and integrated development. Global dry bulk transport market demand is expected to grow by 1.8% in 2020; fleet size by 3.4%, capacity growth is higher than demand growth, and the downside risk of freight rates increases. Due to the outbreak of COVID-19 and weather condition in major iron ore producing countries, the dry bulk transportation market is not optimistic (Clarksons Research, 2020).

3.3.1 Multi-purpose Ship Market Competition Status

By September 2019, the global multi-purpose fleet has a capacity of 409 vessels with 7.281 million deadweight tons. The average age of vessels on the market is 10 years, making the overall situation relatively young. The proportion of 0-5 years ships take 16.6%, the proportion of 6-10 years ships take 44.3%, and the proportion of more than 20 years ships take 4.4%, in some extent of renewal demand. Table 3 shows Clarksons' report on the shipping capacity of the world's leading multi-purpose

heavy lift ships companies.

Table 3

Clarksons' report on the shipping capacity of the world's leading multi-purpose heavy lift ships companies.

Ship company	Nationality	Number of Ships
COSCO Specialized Carriers	China	40
Briese Schifffahrts	Germany	23
Spliethoff	Netherlands	18
Sino-polish ship	China	17
Jungerhans & Co	Germany	17
W.Bockstiegel	Germany	17
Hansa Heavy Lift	Germany	14
Schoeller Holdings	Germany	14
SAL Heavy Lift GmbH	Japan	13

Note:Clarksons' report on the shipping capacity of the world's leading multi-purpose heavy lift ships companies.

It can be seen that the shipping market of multi-purpose ships is highly concentrated, with the top 10 shipping companies taking for 47.9% of the market share and the top 20 shipping companies taking for 64.8% of the market share. The market state belongs to the monopolistic competitive market and is more inclined to the perfect competitive market. Existing competitors are numerous, the competition therefore will be more intense.

3.3.2 *New Entrants to the Multi-purpose Ship Market*

Clarksons' Research shows global multi-purpose ship owners have not been very active in the industry in order to book new ships last year. Even in the best case, orders will not rebound significantly. The industry's cash flow is tight and lacks investment enthusiasm. In the medium term, the oil market turbulence may have a negative impact on the project market and the demand for project ships. Recent new orders (2018/2019) tend to re-lift vessels with greater capacity, but this trend is expected to weaken.

Table 4

Shipbuilding orders for major multi-purpose heavy-lift vessel owners worldwide

Company	Nationality	Number	Proportion
China Shipping Shipping Leasing	China	10	21.70%
Zeaborn	Germany	10	21.70%
Weco Shipping	Denmark	7	15.20%
Spliethoff	Netherlands	6	13.00%
Auerbach Schiffahrt	Germany	4	8.70%
Krey Schiffahrts	Germany	2	4.30%
Unknown German Company	Germany	2	4.30%
Victory Ovation Pte	Singapore	2	4.30%
Briese Schiffahrts	Germany	1	2.20%
Cargow BV	Netherlands	1	2.20%
COSCO Shipping Specialized Carriers	China	1	2.20%
Total		46	100.00%

Note: Owners of major multi-purpose heavy-lift vessels in the world are booking ships

3.3.3 The Threat of Alternatives to Multi-purpose Ship

The dry bulk and container transport sectors are eroding the multi-purpose ship transportation market. Dry bulk carriers and container ships are starting to transport more and more groceries and project cargoes, while the proportion of containerization of cargoes continues to rise. At the same time, due to the trade war, populist policies, and China's economic slowdown, global uncertainty is rising, and all dry goods sectors are affected by the slowdown in demand, which means that the competition for existing goods is more intense. Therefore, we expect the dry bulk and general cargo traffic to grow at an average annual rate of about 2% in the medium term. Susan Oatway, senior analyst for multipurpose and general cargo transportation at Drewry, believes that in the short term, the chain reaction of the container and dry bulk sectors will not benefit the bulk cargo industry, as the supply of ships carrying ordinary goods increases and, at the same time, it is affected by the Sino-US trade war. As China's exports decrease, the demand for multi-purpose freight will weaken, and out of concerns about the global economy, investor confidence may be diminished.

3.3.4 Bargaining Power of Buyer's of Multi-purpose Ship's Services

For multi-purpose ships, steel and renewable energy are the largest cargo demand in Asia. Buyers have bargaining power in this type of ship transportation market, because there are many alternatives for multi-purpose ships. Due to the type of goods transported, dry bulk carriers and container ships have impacted the multi-purpose ship market. But for some larger cargo items, multi-purpose ships will show their own particularity and irreplaceable. And also depends on the type of goods transported by a region or company. Therefore, in general, since there are some

alternatives for multi-purpose ships, the buyer has some extent of bargaining power, but will be affected by the type of goods he transports, and this bargaining power will undergo subtle changes.

3.3.5 Bargaining Power of Multi-purpose Ship Suppliers

Supply side. At present, 12% of the ships in the global multi-purpose fleet are facing the problem of aging. These ships mainly serve the bulk cargo trade in the offshore waters. However, there was no significant increase in the number of ship recycling in the first half of 2019. Based on this, it can be found that the fleet size will increase by approximately 0.3% annually during the forecast period.

3.4 Shortcomings and Potential Problems of the Michael Porter's Five Forces Model in the Analysis of the Special Ship Transportation Market

Michael Porter's Five Forces Model is mainly based on the comprehensive analysis of the current situation of five markets to reach the desired conclusion, but in reality, the factors that can affect an industry are far from these five reasons. In fact, any minor market wobble could end up affecting the market to the same extent as the butterfly effect. For example, the macro-control of the government, the introduction

of international or national policies, climate change, global financial problems, local wars, public health problems, and even celebrity effect will have more or less impact on the market.

At the same time, compared with other business analysis models, such as SWOT model, the abbreviation of four words: Strength, Weakness, Opportunity and Threat. This model is a method to summarize the internal and external research results of enterprises by analyzing their internal and external strengths and weaknesses, opportunities and challenges. Compared with Michael Porter's five forces model, the SWOT Analysis Model is more subjective. However, the prerequisite for the SWOT Model to give full of its effectiveness is to make sure based on facts. If people's cognition and understanding are not completely base on the facts, the SWOT Model will not be able to thoroughly and efficiently analyze the internal and external conditions of the enterprise.

At the same time, for the shipping industry, the scale of the industry is relatively fixed, so only by fighting for the share of competitors in the same industry to occupy a larger resource and market. However, in reality, enterprises often get larger resources and markets by not eating the rivals but making the cake of the industry bigger together with the rivals. At the same time, the market can increase capacity through constant development and innovation.

In the reality production activities, there are still many factors that can influence the trend of the special ship transportation market. Considering the limitations of Michael Porter's five forces model and the integrity of divergent thinking, the second half of this thesis will make corresponding analysis on other factors that may affect the special ship transportation market. The main influencing factors include: policy,

ecological environment, human environment, world economic development, crude oil price, technological development and international maritime laws and regulations.

Chapter Four

Influence of Other Factors on the Special Ship Transportation Market

4.1 Impact in International Shipping Policy on the Market of Special Ship Transport

At present, sulfur restriction is undoubtedly one of the most influential policies on the entire shipping market.

Since 2005, the International Maritime Organization (IMO) has adopted Annex VI of the international convention for the prevention of pollution from ships, Maritime Agreement Regarding Oil Pollution (MARPOL), which imposes increasingly stringent controls on sulfur dioxide (SO_x) emissions from ships. The decision to reduce the global sulphur limit for ship fuel from 3.5% to 0.50% was made in 2008

and reaffirmed in October 2016. Generally, shipping companies' compliance measures mainly include: using compliant fuel with 0.5% or 0.1% sulfur content; Use of the ship's air purification system; Use liquefied natural gas as a source of power for ships. However, at present, the more prominent problem is the shortage of low-sulfur oil supply in global ports. Less than 0.5% of low-sulfur oil is less than 50 million tons, only one sixth of the original high-sulfur fuel market. It is completely unable to replace the demand for high-sulfur oil, and the price difference between the two is also expanding rapidly.

The effect of sulphur restriction policy on the whole shipping industry is also very significant. Firstly, it is reflected in the impact on the market structure of fuel: due to the persistent supply problem, the price gap between the international low sulfur oil price and the high sulfur oil price gradually widens, which has a negative impact on the market balance and leads to the deviation of the cost control of shipping companies. The second is the impact of technical problems: Due to technical problems lead to the high cost of low sulfur oil production, production is low, so many ship companies decided to install or use other clean fuel desulfurization tower (Liquefied Natural Gas), but the problem is that every ship installation cost of desulfurization tower (SCRUBBERS) in 3 to 8 million dollars, centralized renovation of the ship within the period for shipowners and shipping companies will have a huge pressure for investment, and LNG though for clean fuel, but the high cost of LNG facilities renovation, LNG storage and supply also needs a large number of professional operators, which has a higher labor costs, also is not very obvious advantages; Influenced by these factors, the logistics cost must ascend: sulfur limit new fuel surcharge, lies in many shipping companies and port call by trade routes, sailing time, and ship size, the influence of the negative impact of the recycled fuel costs mainly reflects in slow down, stop flights flying, reduce directly affiliated to

switch to transit, transportation delays and capacity reduction, etc., will ultimately affect the quality of the shipping service industry.

4.2 Impact of Environmental Changes on the Shipping Market

4.2.1 Effects of Ecological on Special Ship Transport

The change of ecological environment will have an impact on the shipping market mainly for two reasons: First, the international maritime organization or environmental protection agency will issue corresponding policy requirements in response to the requirements of protecting the ecological environment, such as the sulfur restriction order and the navigation regulations of particularly sensitive sea areas (PSSA); Second, in the field of ecological and environmental protection, in order to realize the company's sense of social and environmental responsibility, relevant regulations will be issued, which will have an impact on the shipping market, strategy and cost. Over the past decade, under the leadership of IMO, the shipping industry has gradually transformed the traditional operation mode of heavy industry and heavy pollution into the operation mode of green shipping and smart shipping. Companies' awareness of environmental protection is gradually improving, ship management mode is standardized, and even companies such as Maersk have completed the sulfur emission standards of national maritime organization within ten years (Liang Yanyi,2020). At the same time, in order to meet these standards,

shipping companies must pay attention to the current situation of their own ship operation and management, which involves enterprise strategy transformation and cost control, etc. The operation mode of ships that meet the standards also reduces the risk of pollution, economic losses and economic penalties caused by environmental damages.

4.2.2 Effects in the Political Environment on the Shipping Market

In fact, today's global political environment is rather complex. What needs to be paid special attention to is the rise of populism in some European countries and the unconventional policies of the trump administration in the United States, which have exerted some negative impacts on the world economy and political order. The trade friction between China and the United States were double game of geopolitical and economic market, and the results are obvious, only both defeats, China faces a slower external investment increase and part of the plight of the foreign factory is located in the migration, the United States with rising unemployment and a weak dollar, Treasury bonds increased and the domestic first industry operation difficult problem of high operating costs and so on.

For the special ship transportation company, the change of the political environment affects the fluctuation of the country's foreign investment and foreign investment and construction. Special ship transport companies usually carry major maritime cargo projects or projects closely related to national strategies. Therefore, when the international political environment changes, special ship transport companies will be obviously affected. Special ship transportation is related to the construction and the implementation of major projects in various countries and is of great significance to the development of each country and region.

4.2.3 Effects in Human Environment on Shipping Market

In the process of economic development, the humanistic environment is like a pair of invisible hands, exerting a subtle influence on the market law. The influence of the humanistic environment on the market economy is often long-term and solidified. Human factors sometimes transcend the laws of economics and affect the operation of the market in a unique way. For the special ship transportation market, the humanistic environment means: the company's reputation; The strength of the country behind the company and the emotional ties between countries that transcend foreign affairs.

The reputation of the company is often determined by the company's historical work, the completion of the project, and the technology and management capabilities of the company. The better a company does this, the better placed it is in the human environment. As a result, more and more people find the company, forming a closed virtuous circle. On the other hand, if a company suffers from a loss of credibility, the discussion in the industry, competitors' missteps and other buyers' distrust of the company will form a vicious circle, the consequences of which are often long-term and serious. Therefore, for companies engaged in special ship transportation, the success of each project not only means a simple completion of the task, but also provides a good reputation for the company's future development. It is also because of the limitations of the special ship transport market, once an accident occurs, it will be widely spread in the industry, causing huge property and reputation loss at least, and heavy customer loss. Therefore, when bidding and receiving projects, shipping companies must consider whether their own strength matches the task, and they must be very careful in formulating transportation plans and implementing them.

The reason why the country behind the company can influence the cultural environment for the development of the company is that in many cases, the comprehensive strength of the country behind the company will affect the judgment of the customer on the strength of the company, especially for the customer who does not know the company well enough for the first cooperation. Moreover, the image of a country in the international community will also have an important impact on the cultural environment for the development of the company. If a country often reneges on its commitment to international co-operation, customers are naturally suspicious of the firm's contractual spirit. If a country is willing to shoulder its responsibilities in international cooperation, the trust and goodwill of customers towards the company will naturally increase.

4.3 Impact of International Economic Trends on the Market of Special Ships

4.3.1 Impact Development Processes in Developing Countries

The construction process in developing countries has an important influence on the shipping companies engaged in special transportation. Generally speaking, the gap between developing countries and developed countries is relatively obvious, especially in terms of economic aggregate, military strength and infrastructure construction. Therefore, with the progress of world economic development, more and

more developing countries begin to pay attention to their own economy and infrastructure construction. Economic development includes bilateral trade, multilateral trade and other international economic models. The trend of construction in developing countries is crucial to the market for special ships, mainly because of the demand for infrastructure construction and the high level of participation of special ship transport companies, so the trend of economic development in developing countries should be kept in constant focus. Infrastructure construction on land reflects high speed railway, network communications infrastructure construction, airport construction, rail transit construction, while the construction in the sea is also very important: port construction, the construction of large ships, oil RIGS, offshore wind power project construction, bridge, tunnel, cable and so on.

At present, there are about 130 developing countries in the world, accounting for 70% of the world's population, mainly in Asia, Africa and Latin America. These developing countries have vast territories, large populations, vast markets and abundant natural resources. There are also many strategic locations that are economically, trade-wise, and militarily strategically important. From the perspective of future trends, the overall growth slowdown of developing countries has become the "New Normal State". Although developing economies are not favored by the west, their growth rate is still higher than that of developed economies and they are an important engine driving world economic growth.

Since the 1990s, developing countries have, on the whole, enjoyed rapid economic development, enhanced their strength and played an increasingly important role in the world economy. The share of developing countries in the world economy has risen markedly. According to the current world economic situation, the construction process in developing countries has slowed down due to the impact of the financial

crisis and COVID-19, but the overall trend is still a slow growth, and many countries have even started to recover the projects delayed due to COVID-19. It will be an inevitable trend for developing countries to develop infrastructure in a sustainable, staged and climax manner.

4.3.2 Effects in the Economic Situation in Developed Countries

At present, the number of developed countries in the world is small, with a total of 31 countries, accounting for one seventh of the total number of countries in the world. However, their international status is very high, and they almost have an absolute say. These countries are concentrated in Europe, North America and Oceania. And almost all the developed countries are big countries in shipping industry. It can be seen that maritime trade has been extremely significant and far-reaching to the development of a country since ancient times. The strength of the sea to some extent reflects the strength of a country's economic strength.

However, since the outbreak of the global financial crisis in 2008, global trade has shown a long-term downturn trend. According to the historical trend of economic development, for the world the ups and downs of the economic cycle should be a ***Ten-year Cycle***, but with the emergence of various *Black Swan* events in recent years, this rule has been broken. The combination of the global epidemic, oil war and trade war has led to drastic price fluctuations in the global market. The shipping industry is one of the most severely affected industries by the financial storm.

The overall economic growth rate of advanced economies in 2020 will decline from 1.6% in 2019 to 1.4%, mainly due to continued weakness in manufacturing. The US economic growth rate in 2020 will slow to 1.8% to 2.0%, reflecting the negative

effects of the increased tariffs and rising uncertainty in the previous period. Due to weak industrial activity, the euro zone's economic growth rate in 2020 was reduced to 1%.

At the same time, the construction process of developing countries has gradually entered a bottleneck period, which also has a negative impact on the development of the primary industry in the world. Developed countries have long paid more attention to their national welfare, advanced industry and manufacturing capabilities of cutting-edge industries (Lloyd's Register, 2017). In terms of shipping industry, shipyards, shipping companies and ports in developed countries generally pay attention to the research and development of cutting-edge technology ships, the formulation and guidance of industrial rules, and the value of cargo handled at ports. Developed countries are often equipped with advanced scientific research equipment, cutting-edge scientific research talents and huge financial support, giving them more opportunities to create a shipping system that will change the shipping pattern. At the same time, the developed countries go further in the frontier technology and at the same time give up some medium and low-end markets. These markets are gradually contracted by those companies with proper standards or even advanced technologies, strong corporate strength and the willingness to earn low profits.

4.4 Impact of Technological Innovation

4.4.1 Effects of Energy Saving and Environmental Protection Technology on Special Ship Transport Industry

The energy-saving and environmental protection technology of ships simply means that in the entire life cycle of ship design, manufacturing, operation and disassembly, in addition to meeting the production needs, the ship's fuel consumption, greenhouse gas emissions such as CO₂, NO_x, SO_x and harmful substances The output is effectively controlled to save resources and energy and reduce or eliminate environmental pollution (International Maritime Organization,2017). Among them, the basic connotation of green ship technology can be understood. Green design technology refers to the simplification of ship design in the design stage of ships. The design materials are non-toxic and harmless materials, reusable materials, standardized parts or units. And make sure that the environment is not damaged and resources are not wasted in ship dismantling. Green manufacturing technology refers to the use of green materials in the process of shipbuilding, processing, welding and painting, energy consumption and pollution are reduced. Green management technology means that the ship is in operation.

In the management, the green-house gas and exhaust emissions are controlled, fuel consumption is reduced, garbage and sewage are treated reasonably, and the unloading of bilge oil is strictly controlled. Green dismantling technology refers to reducing the degree of environmental pollution when dismantling scrapped ships, increasing the recycling rate of parts and materials, and reducing resource consumption.

4.4.2 Impact of DP Technology on Special Ships

DP means dynamic positioning system.

The semi-submersible platform is one of the main equipment for oil and gas resources development because it has a small movement amplitude under severe sea conditions, which is conducive to improving the comfort of human habitation. With the development of oil and gas to the deep sea, it is difficult for the traditional mooring system to meet the requirements of deep sea positioning (Jun Ye & Spandan Roy & Milinko Godjevac & Simone Baldi, 2019). As an effective solution, the Dynamic Position system has been widely used in the design and manufacture of semi-submersible platforms (He Mingan, 2015).

DP system has a very important application value for offshore engineering ships, which can help the ships accurately locate to the scheduled installation area, greatly facilitate the engineering, improve work efficiency, and effectively reduce the accident rate. Therefore, the development of DP system technology is quite important for the special ship transportation market, especially for semi-submersible ships and ships that can carry out offshore installation engineering. Master the application of advanced DP system, can be more safe, efficient and accurate to complete engineering projects, is also an important reference standard when customers choose service.

4.5 Impact of Fluctuations in Crude Oil Prices in Ship Market

Under major cargo and other special transportation modes, fuel costs account for 70% to 80% of the voyage cost (Liang Yanyi,2020). Companies engaged in special transportation usually use a charter contract. The shipping company is responsible for the operation and use of the ship, arranging the voyage and collecting freight. In the case of major goods and other special modes of transport, the fuel cost accounts for 70 to 80% of the voyage cost. The company engaged in the special transport company usually uses the lease contract, and the shipping company is responsible for the operation and use of the ship itself, arranging the voyage and collecting the freight. In October 2019, as U.S. sanctions affected about 3% of the world's tanker capacity, tanker freight rates soared against the backdrop of supply-side tightening, and average earnings rose above \$80,000 per day in mid-October 2019.

At the same time, the most direct impact of the use of low-sulfur fuel on shipping companies is the sharp rise in costs. The uncertainty of the installation of the desulfurization tower also causes downward pressure on the supply side. Taking the Platts Price Index at the beginning of February 2020 as an example, the average price difference per ton of 380 CST high-sulfur fuel and 0.5% low-sulfur fuel is \$ 200, and the cost difference of a single refueling can reach more than \$ 100,000. Under the superposition of multiple pressures such as a downturn in the market, stricter compliance and increased costs, shipping companies have huge cost pressures. Contracts for the transportation of major goods and equipment are usually negotiated on a one-vote basis (Ginnis & Kostas & Politis & Kaklis ,2010). Therefore, it is very critical for shipping companies to balance the pressure of rising fuel costs through the charter party contract. According to market conditions, negotiation status and

bargaining power, common practice direct increase in freight rates, the establishment of fuel surcharge clauses in the contract, and agreed fuel price floating mechanism is effective. In addition, after the implementation of the sulfur restriction order, the shipping company may delay the voyage due to fuel quality or fuel injection in the execution of the lease business, and special attention needs to be paid to the agreement of the breach clause such as winding (Liang, 2020).

Chapter Five

Summary and Conclusions

Through the analysis of Michael Porter's Five Forces Model of three representative types of special ships, we have a deeper understanding of the whole special shipping market. The following is the conclusion obtained by combining the completed analysis of Michael Porter's Five Forces Model with other factors other than the five forces model.

5.1 Future Trends and Opportunities in the Market of Special Ship

In general, the market of special transport ships in the first half of 2020 was affected by slow global economic growth and COVID-19. The overall performance was sluggish, and the trend of each market segment was not the same, but all of them

were weak. It is expected that in the second half of the year, the pressure of supply and demand contradiction between semi-submersible ship and timber ship is relatively large, and the asphalt ship and automobile ship are expected to slightly improve under the favorable season and policy factors.

Semi-submersible vessel's shipping market: According to statistics, there are currently 59 semi-submersible vessels in service in the world, of which 17 are under construction or have signed orders. The main semi-submersible ship operators in China are COSCO Specialized Carriers, Zhenhua Port Machinery Company Limited and the Salvage Bureau. Although the current semi-submersible transport market is affected by factors such as excess capacity and depressed Marine industry market, the rigid demand in the near future, the future demand growth trend and the special advantages of semi-submersible transport vessels will not change in a short period of time.

Pulp ship's shipping market: The global transportation of paper products includes the transportation of recycled fiber, market pulp, flat paper and paperboard. The average monthly transportation volume is about 40 million tons. The transportation volume in 2018 is less than that in the same period of 2017. In particular, the transportation of recycled fiber due to the ban on waste caused by the decline is relatively large, the growth is due to the growth of global cardboard consumption of pulp trade transport volume. Traditional shipping lanes of the top 10 of paper products, North America, Western Europe and Japan to China waste paper recycling fiber volume sharply reduced, the north American trade policy led to a pulp import and export route traffic volume decreased, and Latin America to Western Europe, Latin America and Western Europe to China's pulp export volume, influenced by demand from China, there is a certain growth.

5.1.1 Development Trend of Special Ships

With the application of new generation information technology in world and the development of cloud computing, Internet of Things, big data, mobile e-commerce and other technologies, special transportation has entered the stage of information development. At present, the market of various segments of the special transportation industry is accelerating. Driven by policy support and events, the special transportation industry has ushered in a new wave of investment. Special transportation companies have further expanded and increased demand has increased competition in the domestic special transportation market. With the rapid development of the special transportation industry, channel expansion and capital operation among large enterprises are becoming more and more frequent. Domestic excellent special transportation companies, such as Tielong Logistics, China Railway Special Cargo, China Storage Co., Ltd., and COSCO Container Lines, etc., are increasingly paying attention to market research, especially in-depth research on the development environment of the special transportation market and changes in customer demand trends, a large number of outstanding domestic special transportation companies have rapidly emerged, gradually becoming leaders in the industry, and the market competition is becoming increasingly fierce.

With the adjustment of agricultural structure, the advancement of industrial technology and the improvement of the consumption level of residents, the output and circulation of fresh agricultural products food have increased year by year. The development of the cold chain logistics industry has gradually moved from the Pearl River Delta and the Yangtze River to central and western regions.

With the development of social economy, the pace of industrialization, infrastructure, and internationalization has accelerated across the country. The transportation of flammable and explosive gases, liquids, various radioactive and corrosive substances has increased, while the transportation of dangerous goods Its position in the development of the petroleum and chemical industry is increasingly prominent. At present, the total amount of dangerous chemicals in the transportation field has accounted for more than 25% of the total amount of transportation in various ways. With the increasing demand for Chinese petroleum, chemical and other products, the corresponding product transportation industry will also develop rapidly, which will provide huge development opportunities for the dangerous goods transportation industry.

China's infrastructure investment is accelerating, and the demand for large-scale equipment in power engineering, energy power generation, marine engineering, chemical production and other industries is also increasing, providing a development space for the large-scale transportation market. The field of China's foreign trade is expanding, such as yachts, small ships, helicopters, aircraft tails, aircraft cabins, high-speed train locomotives, transformers, ultra-long chemical facilities distillation towers and other special large cargoes, are passing more and more to transportation by sea. In the future, large cargo transportation will have outstanding demand in the fields of energy power generation and marine engineering, and the market will further expand.

The global shipping market will be affected by the economic environment in 2020, and the growth rate will further decrease. If the severity of various events intensifies, the growth rate of the global shipping market in 2020 will fall below 1%. Due to the difficult after-effects of the shipping market in 2019, market confidence has been

severely hit. At the same time, it has continued to digest the excess capacity of the fleet and deal with the slowdown in trade, which has left great challenges for the entire market operation in 2020 space.

Judging from the overall development of the global shipping industry and ports, because the world economy, international merchandise trade and shipping shipments still have some growth space, the prospects for global shipping and port business activities can still remain in an optimistic state. However, there are still many uncertain factors in the global economy and trade (Staffurth C.,1984). The emergence of the new coronary pneumonia epidemic has increased the difficulty of economic growth, which has caused certain pressure on the global shipping industry, and the overall development of the shipping industry will also be affected.

5.1.2 Opportunities and Challenges in Special Ship Market

The development opportunity for pulp ship:

From 2019 to 2020, the global pulp capacity expansion slow down obviously, but there will still be a tiny increase, with the vast majority of the increase coming from broadleaf pulp. The net growth is expected to reach 2.195 million tons and needle pulp 90,000 tons. By region, Brazil's Fibria and Eldorado have added a total of 2.175 million tons of new ship's carrying capacity, accounting for more than 90%. Europe will add 320,000 tons of needle-leaved pulp and 20,000 tons of broad-leaved pulp. APP pulp plant in Indonesia will increase and shrink by 50,000 tons in 2019 and 2020 respectively, and its overall production capacity is flat. From the perspective of market supply and demand, the pulp market has a good prospect, with a large scale and controllable risks. In particular, China's pulp imports quantity will be very high

in the future, which can keep supply chain steady. Currently, the global total number of pulp ships is about 300, which is a small branch market of the whole shipping industry, with highly concentrated pulp ship capacity and a high degree of market monopoly. In the next few years, the demand for pulp transportation will keep growing, and it is expected to absorb the existing and new capacity. From the perspective of business model, pulp ship operating companies have signed long-term COA contracts with major pulp production suppliers in the world, with a term ranging from 3-5 years to 10-15 years, forming a stable strategic cooperative relationship. The long-term COA contract is accompanied by the linkage clauses of oil price. The operating cost is relatively fixed, and the revenue and cost are relatively locked, which is conducive to the formation of long-term stable income.

5.2 Prospects and Recommendations for the Special Ship Transport Market

About the development trend of multi-purpose heavy lift vessel: According to Clarksons' research in March 2020 shipping market: in the offshore engineering sector, there are now approximately 10,000 ships and drilling rigs in worldwide supporting the exploration, development and production of offshore oil and gas. Offshore oil and natural gas account for 27% and 32% of their global production,

respectively. In the next few years, with the gradual recovery of the global economy and the transfer of global industrial layout, the demand for infrastructure construction and engineering project construction will gradually release, and the demand for engineering equipment maritime transportation will pick up. In addition, considering that there are currently 46 multi-purpose heavy lift vessels under construction, accounting for 10.5% of the global multi-purpose fleet capacity, it is expected that the multi-purpose ship market will continue to maintain at a low level of demand in the coming years. In addition, the multi-purpose ship itself is also developing, large scale, energy conservation and environmental protection, ice operation capacity is the future development trend, lifting capacity, loading capacity and other performance requirements are also increasing.

According to the Appendix *table 1* that the number of equipment leases for offshore platform has increased significantly. In the first season of 2019, for example, 73 oil-drilling platform leases were ordered, it is the highest number since 2016. Among them, 25 were long-term contracts of more than one year, which accounted for an increased proportion of total leases. It is up about 17% from its lowest point; The index closed at 90.29, up about 19% from its lowest point. The daily rig rental index closed at 49.87, up about 7 percent from its nadir. As oil prices stabilize and recover, the game between oil companies and rig operators is shifting subtly, with some seizing on the current downturn in rents to lock in long-term low-cost leases to maintain their low-cost advantage. For the carrier, the rent price shows bad effect, although there will be an adverse effect on economic benefits to the companies, but since it is already becoming true, carrier need to stop losing more money right now, to give up the sunk costs, make reasonable prices at this time should be according to the actual market demand, try to attract customers, and to establish long-term trade partner relationship, when oil prices and rents the price pick up, forming a seller's

market, then to dominate the market price.

About the prospects of semi-submersible vessel market: in 2018, the impact of the international financial crisis slowed down, the international economy continued to recover, the oil price rose, and the enthusiasm for oil energy development led to the bottom rebound of the Marine engineering equipment transportation market. But the current oil drilling platform overall utilization level is low, at around 70% of Marine engineering equipment rental prices are relatively low, semi-submersible barge market more competitive, but the long term, with the deep energy engineering investment increase, rising transportation demand of various oil and gas production equipment and oil equipment present large-scale, semi-submersible vessel will be applied more and more. The prediction given by Clarksons is that offshore oil production will reach maximum in 2028 and 2040, and natural gas is still the main growth driver of the offshore engineering industry. At present, there are about 600 ships serving offshore wind power projects, and the offshore wind power supply accounts for less than 0.1% of the global supply. Therefore, the peak production capacity of offshore wind power projects will arrive in 2050, when it will account for 4-6% of the global energy supply. With the development of large-scale petroleum equipment, higher requirements have been put forward for the scale and load capacity of semi-submersible ships. Semi-submersible ships with greater load capacity, higher stability, more safety and stronger function are the future development direction. Therefore, in the long term, the renewal and building of semi-submersible vessels still have advantage.

5.3 Conclusion of Market Analysis of Special Ships

Focus on the optimization reform of shipping company operation mode. In terms of operation mode, companies engaged in special ship transportation should try to seek and take over large-scale projects in areas with large demand for infrastructure construction, integrate superior resources, coordinate fleet deployment, and coordinate the deployment of various special transport ships. Focus on the development of cooperative relations in the market, we should strive to complete some difficult projects to build their own brand value, use the brand effect to form a closed virtuous circle, so as to take over more projects with great strategic value and commercial potential. Focus on the impact of emerging technologies on the shipping market. From the perspective of technology, companies engaged in special ship transportation should actively seek solutions to face the market downturn and upgrade ship construction and operation technologies, so as to make special ships have the comparative advantages of low fuel consumption, low emissions, low cost and low investment and seize the market. Each technology research and development team and ship equipment manufacturer should also take advantage of this special period, in-depth research and exploration of new methods and improvement solutions to solve the above problems.

In particular, greater efforts should be made to pursue infrastructure projects, such as port construction and offshore wind power projects, oil and gas field development, and other major offshore projects or transportation of major components. Attention to the development and utilization of the arctic route at the same time, currently only COSCO Shipping group in worldwide, has the ability of carrying special cargo sailing on the poles, especially pay attention to the development and utilization of

arctic passage, with the global warming is melting glaciers, the year period of ship can sail in the arctic is more and more long, the arctic channel can significantly shorten the distance between Asia and Europe, for all the meaning of navigation of ships, including special ships is very important.

Pay attention to the adverse effects and favorable opportunities brought by the global economic market fluctuations caused by uncertain factors. Global economic situation is not optimistic, because will be COVID-19 disease cause shipping market is full of uncertainty, the influence of shipping giant Hapag Lloyd, six 23,000 TEU ships therefore postponed the order and construction plans, ultra large container ship for Hapag Lloyd, at present the most important thing is to be able to leave enough money to through difficult times, but this demonstration will give this panic is the greater pressure on the new shipbuilding market downturn, some volume smaller companies may be due to the economic downturn of comprehensive facing bankruptcy. In terms of the global situation, companies engaged in special ship transportation should always pay attention to the impact of international developments and relevant international conventions and rules (Michael.W et al., 2015). In many cases, it is the details that determine the success or failure. Any weak details may be a key information and even affect the development of the whole industry. Judging from the current situation by the time of this writing has more than one million five hundred thousand people worldwide infected with COVID-19, a large number of infrastructure projects is delayed or canceled, but the disease's influence is waning, and will eventually be overcome by humans, these are just a matter of time, some countries have begun to restore the normal production and living rhythm, so engaged in specialized shipping company should take this opportunity, to seek cooperation opportunity, use of network resources, study the market demand, targeted to do engineering business activities, once the bilateral or

multilateral fully recover normal production order, You need to start the project process as quickly as possible.

Pay attention to the cost control in the development of the company. “Cost control mainly includes ship operation cost, human resource cost, fuel cost and port agent” (Adam S. M & Anders N & Fred A. J, 2014). It is also very important for the long-term development of a shipping company to reduce other unnecessary expenses as much as possible while ensuring the positive development of employees.

Pay more attention to the trend of global oil price changes, the transportation of offshore equipment such as oil drilling platforms, and the development of enterprises' own reputation and technology. “On 20th April, 2020, the may contract on WTI crude oil on the Chicago Mercantile Exchange (CME) fell \$55.9/BBL to a low of \$40.32 / BBL for the day. At the macro-perspective, affected by the epidemic, global economic development has come to a standstill, and the demand for crude oil has been greatly reduced” (Sui Cong,2020,p.5). OPEC (Organization of Petroleum Exporting Countries) have been unable to reach an agreement on reducing output. As a result, the supply of crude oil has been increasing, and the imbalance between supply and demand has led to a sharp decline in the price of crude oil. Although the storage cost of crude oil does not change significantly from day to day, the subsequent increase in inventories leads to higher storage and transportation costs, further impacting the price of crude oil. In 2020, the supply and demand of crude oil market is out of balance, and the increased demand for crude oil transportation leads to a quietly rising shipping market. However, even so, the shipping price of crude oil has not exceeded the market peak in 2019. Moreover, since the financial crisis in 2008, the shipping market has been in a downturn, and even the market peak in 2019 has not reached the level of the shipping market before 2010, so the saturation period of the shipping market has not yet come.

At the level of international policy and national laws and regulations, the most obvious impact of the latest sulfur restriction orders on the special ship transport market is the most obvious. The reason is that the requirement of fuel exhaust emission from ships in the sulfur limit order leads to a large increase in the cost of ship operation, which has a negative impact on the development of ship companies in the short term. A special ship company should speed up the study of ship fuel technology, seek a stable supplier of low-sulfur oil, and transform the ship to make the ship meet the IMO emissions, the adjustment of the fuel price terms of the INTERTANKO, the re-examination and formulation of the overweight cargo charter contract, the formulation of a new low sulfur fuel surcharge policy, and so on. Keep costs as low as possible on the basis of compliance.

Under the influence of the afterwave of the sub-prime mortgage crisis, the capitalization of shipping has not fully played the function of optimizing the allocation of shipping assets in the major shipping market. With the gradual improvement of maritime finance policies and regulations, the future development prospect of maritime capitalization is promising (Chen Zhuli, 2019). But in the face of the temptation of capital, shipping enterprises should also remain sober, avoid blindly pursuing fleet large-scale and ship large-scale, guard against excessive investment and high leverage of enterprises, do a good job of capital risk control, turn capital advantages into effective professional advantages, and maintain a good momentum of development of enterprises.

At the same time with the outbreak of the global epidemic, the trade war and the oil war are both happening world wide. As a result, the price of the global shipping market fluctuates violently, and misjudgment and misdetermination of the price often occur in the market, which greatly increases the difficulty of market risk control.

Competition for pricing power may be the normal feature of the future global economy. The influence of tanker shipping market on crude oil price may lead to the transmission of crude oil price from transportation volume, in-transit storage function, transportation time difference, transportation cost variation, etc. Conversely, the price of crude oil can also affect the transportation volume, in-transit storage function, transportation cost changes, etc.

Above all, the fact that the shipping market continues to be depressed is undeniable and inevitable, but for the companies engaged in shipping is not completely without the opportunity to reverse the decline, formulate reasonable policies, comply with the development of science and technology, and seek a breakthrough is the key for developing of the company.

From this thesis, through the analysis of Michael Porter's Five Forces Model, the analysis of the special ship transport market, the analysis of the ship companies engaged in special ship transport, the analysis of the factors affecting the special ship transport market in the world. It is hoped that the analysis to special ship's market will make the readers understand the present situation and future development trend of special ship transportation market more deeply. In the current international situation, many uncertain factors affect the development of economy and trade, the author has to make some analysis with the limited data and the existing policies and situations, but with the occurrence of black swan events in the international community, subtle differences will lead to the prediction of the results in an irreversible way. The international political situation, the impact of the epidemic, the need for environmental protection, technological development, the change of international oil prices, the company's own reform, the policy impact at the national level will all have a profound impact on the shipping market.

Keep an eye on it and stay sensitive to market transform.

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LIST OF ABBREVIATIONS

CME	Chicago Mercantile Exchange Holdings Inc.
COA	Contract of Affreightment
CST	Centistokes
DP	Dynamic Positioning
DWT	Deadweight
EPC	Engineering Procurement Construction
IMO	International Maritime Organization
LNG	Liquid Natural Gas
INTERTANKO	International Association of Independent Tanker Owners
MARPOL	International Convention for the Prevention of Pollution from Ships
MEPC	Maritime Environmental Protection Committee
MSC	Maritime Safety Committee
MW	Million Watt
OHT	Offshore Heavy Transport
OSV	Offshore international support vessels

OPEC	Organization of Petroleum Exporting Countries
PSSA	Particularly Sensitive Sea Area
SSCV	Semi-submersible crane vessels
TEU	Twenty-feet Equivalent Unit
UNCTAD	United Nations Conference on Trade and Development
WTI	West Texas Intermediate

Appendix

Table 1

Clarksons' Research Ocean Engineering Market Impact Tracking

Market Index	Unit	Time order ID	201 4	201 7	201 9	Jan	Feb	Mar	Apr	May	Comments	YTD/Latest
Brent oil price	\$/bbl,Avg	901478	99.0 4	54.2 6	64.1 9	63.7 5	55.7 8	33.74	27.25	1 May:\$25.95	Latest price end April c.\$20/bbl	-61%
6-month forward oil price	\$/bbl,End	-	-	-	-	55.7 9	49.8 5	35.49	31.33	1 May :\$2.17	Market in Contango,though shallower than a month ago.	-51%
Added COVID-19 confirmed cases	No,Daily Avg	-	0	0	0	954	2,60 6	21,467	80,019	Apr 29:81,678	Global Cases and deaths plateauing as of late April	-
Global GDP growth rate forecast in 2020	% yoy	10659	+3. 6%	+3. 8%	+2. 9%	+3. 4%	+3. 1%	+1.4%	-3.0%	-3.0%	Further IMF downgrade possible	-6.4pts
Global crude oil demand	M	901551	93.1	98.0	100.	101.	101.	95	78	-	Record Oversupply (Q2	-24%
Global crude oil supply	bpd,Avg	901826	94.3	97.8	1 100. 4	6 102. 2	5 102. 0	101.9	103.9		demand is down by >20m bpd)	+2%
The final investment of the offshore project determines the capital expenditure	\$bn,	789580 3	\$94 bn	\$87 bn	\$10 5bn	202 0:\$1 16b n	202 0:\$1 16b n	2020:\$ 60bn	2020:\$4 4bn	2020:\$44bn	\$13.8bn committed in ytd 2020	-58%
Number of contracts issued for floating production equipment	No	108785 2	17	11	14	202 0(f): 18	202 0(f): 18	2020(f): :16	2020(f): 11	2020(1):11	4 awards in ytd.3 of 7 remaining units are small jack-up MOPUs	-21%
Floating drilling equipment utilization	%Start	900941	97 %	64 %	65 %	70 %	69 %	72%	74%	65%	Likely to decline sharply in 2020	-5pts
Self-elevating drilling	%Start	900932	95	64	65	70	69	72%	78%	78%	May be a little more robust	+2pts

equipment utilization			%	%	%	%	%					than floater utilization.	
Number of active drilling units	No,Start	901578	742	439	451	503	506	515	522	495		Already weakening during April as rigs are suspended.	+3%
Thermal stop drilling device	No,Start	901638	33	245	212	167	168	161	154	154		Downturn may increase scrap	-6%
Cold stop drilling device		901629	85	175	139	127	124	123	123	125		sales of cold stacked rigs.	-4%
Drilling equipment lease adjustment	No	-	-	-	-	0	0	14	39	-		Drilling Suspensions may over time become terminations.	53 since Feb
Three-purpose workboat utilization rate	%,Start	795021	85	61	55	60	58	56%	59%	61%		May get a boost from towage of killing rigs,before weakening	-2pts
		5	%	%	%	%	%						
PSV utilization	%,Start	795030	89	61	58	64	64	65%	66%	64%		Likely to weaken over Q2	-1pts
Beihai PSV utilization		2	%	%	%	%	%	79%	81%	74%			-4pts
		795023	94	63	74	78	77						
		2	%	%	%	%	%						
Offshore Ship Rental Price Index	Index,Start	901573	165.9	75.3	82.0	97.8	98.0	98.6	94.3	-		OSV rates set to weaken	-4%
The North Sea large platform supply charter rate	£/Day,Start	901281	£ 18,500/day	£ 6,000/day	£ 9,500/day	£ 18,500/day	£ 11,500/day	£ 11,500/day	£ 7,500/day	-		As the most liquid market,the North Sea has responded rapidly.	-35%
Handheld orders for underwater operations	\$bn,Latest	901825	\$33.8bn	\$17.8bn	\$19.1bn	\$19.0bn	\$19.7bn	\$19.7bn	-			Project delays likely to weaken backlog	+4%
Clarksons Offshore Index	Index,Start	901535	100.0	45.7	49.4	58.6	58.9	59.2	56.9	-		Rates of all offshore sectors set to come under pressure	-2%

Note:From Clarkons Research, May, 2020

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